State of California
California Environmental Protection Agency
Air Resources Board

Barrio Logan Toxics Monitoring Sampling Protocol

Air Quality Surveillance Branch
Monitoring and Laboratory Division

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Prepared by: _____

Reginald L. Smith
Project Engineer
Air Resources Board

Approved: _____

Kenneth R. Stroud
Manager, Special Purpose Monitoring
Air Resources Board

Approved: _____

William E. Oslund
Chief, Air Quality Surveillance Branch
Air Resources Board

Approved: _____

William V. Loscutoff
Chief, Monitoring and Laboratory Division
Air Resources Board

ACRONYMS

AIRS – Aerometric Information Retrieval System

API – Advanced Pollution Instrumentation

AQDAS II – Air Quality Data Acquisition System version II

AQSB – Air Quality and Surveillance Branch

ARB – Air Resources Board

BAM – Beta Attenuation Monitor

CFR – Code of Federal Regulations

ECD – Electron Capture Detector

EHC – Environmental Health Coalition

EMC – Environmental Management Corporation

GC – Gas Chromatograph

HPLC – High Performance Liquid Chromatograph

IC – Ion Chromatograph

LIMS – Laboratory Information Management System

MLD – Monitoring and Laboratory Division

OEHHA – Office of Environmental Health Hazard Assessment

PID – Photo-ionization Detector

$PM_{2.5}$ – Particulate matter with an aerodynamic diameter less than 2.5 μm

PM_{10} – Particulate matter with an aerodynamic diameter less than 10 μm

QA – Quality Assurance

QC – Quality Control

QMOS – Quality Management and Operations Support

SDAPCD – San Diego Air Pollution Control District

SPM – Special Purpose Monitoring

SSI – Size Selective Inlet

TAC – Toxic Air Contaminant

TECO – Thermo Environmental Corporation

UV – Ultra Violet

I. Objective

The objective of this monitoring project is to produce data which could be used to determine the potential for human health impacts from concentrations of toxic air contaminants (TACs) in the Barrio Logan community of San Diego. The project will assess differences, if any, in concentrations of TACs at three locations in the San Diego area – Barrio Logan and two long-term TAC monitoring stations operated in Chula Vista and El Cajon. Samples will be collected every fourth day at the Barrio Logan site and every 12th day at the Chula Vista and El Cajon sites from 21 October 1999 to 31 March 2000. This period was chosen because higher concentrations of TACs are typically seen in the winter months. Differences will be assessed principally by comparing average winter concentrations at the Barrio Logan site to winter averages for the previous two or three years at the Chula Vista and El Cajon sites.

There will be up to fourteen (14) days during this project when sampling days at Barrio Logan, Chula Vista and El Cajon coincide. These data pairs will also be compared to look for concentration differences between sites. Because there will be so few pairs of data to directly compare, we expect substantial uncertainty with respect to the conclusions that we might draw by comparing data pairs.

The decision to conduct this study was a result of discussions between the Environmental Health Coalition (EHC) and the San Diego County Air Pollution Control District (SDAPCD). The EHC had requested that the SDAPCD conduct such monitoring, however the District did not have resources available. The Air Resources Board (ARB) agreed to support the effort with samplers and analytical laboratory analyses.

II. Background

California's TAC identification and control program requires the ARB to determine the extent of public exposure to candidate TAC and, in cooperation with the Office of Environmental Health Hazard Assessment (OEHHA), to describe the nature and magnitude of the human health risk to that exposure. Upon consideration of the public health risks and exposure, the ARB may formally identify a substance as a TAC. After the formal identification phase, ARB may then determine the need and appropriate degree of regulation and control for that substance. Standards are not issued for compounds identified as TAC. Instead, controls are required for the sources of the emissions.

In 1984, the ARB initiated a state-wide ambient toxics monitoring network to provide the data required to measure average ambient concentration of TACs. Since that time, the ARB and local air pollution districts have operated a twenty station monitoring network collecting samples every 12th day.

III. Description of ARB's Mobile Air Monitoring Trailer (Rover)

The ARB's Mobile Air Monitoring Program has been developed to provide ambient air monitoring support for the ARB. The Rover is a full air monitoring station capable of monitoring and collecting air samples for ozone, oxides of nitrogen, carbon monoxide, PM_{10}, $PM_{2.5,}$ wind speed, wind direction, ambient temperature, halogens, aromatics, 1,3-butadiene, oxygenates, aldehydes, hexavalent chromium, total metals and additional analysis as required.

The Rover consists of a 16' by 7' Wells Cargo trailer and is towed by a 1990 GMC Surburban. The trailer is equipped with a 7' by 10' roof mounted platform to allow for rooftop mounted samplers.

IV. Study Participants and Contacts

ARB Monitoring and Laboratory Division

Chief, Monitoring and Laboratory Division
Bill Loscutoff, (916) 445-3742

Chief Chemist, Monitoring and Laboratory Division
Mike Poore, (916) 322-6043

ARB Air Quality Surveillance Branch

Chief, Air Quality Surveillance Branch
Bill Oslund, (916) 445-3745

Manager, Special Purpose Monitoring and Data Support Section
Ken Stroud, (916) 324-7591

Air Pollution Specialist, Special Purpose Monitoring and Data Support Section
Reggie Smith, (916) 327-1238

ARB Quality Management and Operations Support Branch

Chief, Quality Management and Operations Support Branch
Jeff Cook, (916) 322-3726

Manager, Quality Assurance Section
Mike Miguel, (916) 324-6191

ARB Engineering and Laboratory Branch

Manager, Inorganics Laboratory Section
Russell Grace, (916) 322-0223

Manager, Organics Laboratory Section
Hieu Le, (916) 322-6042

San Diego County Air Pollution Control District
Chief, Monitoring and Technical Services
Judy Lake, (858) 694-2730

Manager, Ambient Monitoring Section
Mahmood Hossain, (619) 694-3358

Manager, Meteorology Section
Bill Brick, (858) 694-3496

Don White, (858) 694-3357

Dick Smith, (619) 694-3303

San Diego Unified School District.
Director, Facilities Development Department
Thomas Calhoun, (619) 293-8327

Environmental, Occupational and Safety Technician
John Baker, (619) 627-7350

Environmental Technician, Facilities Development Department
Tony Raso, (619) 293-8280

Environmental Health Coalition
Co-Director, Toxics Free Neighborhood Campaign
Paula Forbis, (619) 235-0281

U.S. Environmental Protection Agency
Clarice Gaylord, (619) 235-4767

American Lung Association
Jan Cortez, (619) 297-3901

U.S. Navy Region SW
Martha Gandy, (619) 524-6091

Solar Turbine
Craig Anderson, (619) 554-5126

IEA

Patti Krebs, (619) 554-9684

USC School of Medicine
Ed Avol, (323) 442-1090

CMSD
Harvey Porter, (619) 234-8851

V. Roles and Responsibilities

Mr. Bill Oslund is the chief of the Air Quality and Surveillance Branch (AQSB). In this role, Mr. Oslund will have the responsibility for ensuring that the overall technical and operational goals of this project are met. The AQSB will:

- Perform installation/de-installation of mobile air monitoring station
- Operate criteria pollutant monitoring equipment
- Perform pre and post calibration of sampling equipment
- Perform monthly data review/submittal to AIRS for criteria and meteorological data
- Prepare study protocol
- Prepare final report

Mr. Cook is the chief of the Quality Management and Operations Support Branch (QMOS). In this role, Mr. Cook will have the responsibility for ensuring a performance audit is conducted at least once during the study period. QMOS will:

- Conduct one performance audit on all sampling equipment

Mr. Poore is the chief chemist of the Monitoring and Laboratory Division. In this role, Mr. Poore will ensure the ARB laboratory accomplishes the following:

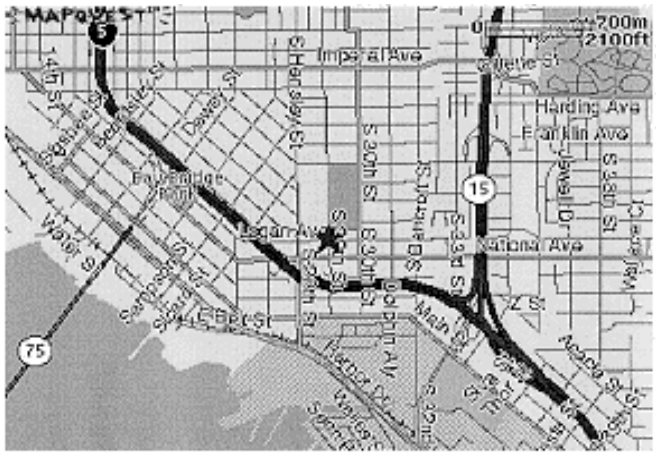
- Provide adequate supply of sampling media
- Perform sample analysis
- Perform data review/submittal to AIRS for toxics data

Ms. Lake is the Chief, Monitoring and Technical Services of the San Diego County Air Pollution Control District. In this role, Ms. Lake will oversee operation and collection of toxic air sampling. The SDAPCD will:

- Operate toxics air samplers
- Coordinate with ARB to ensure adequate supply of sample media
- Collect and forward sampled media to ARB laboratory
- Complete records for each sample taken at the site (24-hour sample reports)
- Complete sampler maintenance documentation (monthly QC sheets)

VI. Location

The site selected for this study is on the grounds of the Logan Memorial Junior High School, located on 28th Street and Logan Avenue in San Diego, California. The junior high school was one of twelve candidate sites in the project area. The site was selected through a cooperative effort between the SDAPCD, the EHC, the ARB and the San Diego Unified School District. The site was selected because of its downwind location from potential emission sources including the I-5 freeway. The site will be designated as a Special Purpose Monitoring (SPM) station for all sampling parameters and will be classified as neighborhood scale.



Barrio Logan Monitoring Site

VII. Study Period and Sampling Schedule

The study will commence on 21 October 1999 and continue through 31 September 2000. During the period from 21 October 1999 to 31 March 2000, toxic compounds will be sampled on a 1-in-4 day sampling schedule from midnight to midnight. This 1-in-4 schedule will coincide with ARB's normal 1-in-12 day toxic sampling schedule. From 1 April 2000 to 31 September 2000, only hexavalent chromium and aldehydes will be collected on the ARB 1-in-12 day toxic sampling schedule. Criteria pollutant and meteorological monitoring will be collected continuously during the study.

VIII. Data Handling

Criteria Pollutant and Meteorological Parameters

Criteria pollutant and meteorological air quality data will be collected using an Environmental Management Corporation (EMC) Station Manager Data Logger. EMC data loggers are used to collect, process and report air quality data for the ARB's statewide air monitoring network. The EMC data logger converts the analog outputs of various analyzers (ozone, carbon monoxide etc.) into digital minute and hour averages. These averages are polled over telephone lines via an Air Quality Data Acquisition System version II (AQDASII) communication server and stored in a SQL data base on an AQDAS-II file server.

Once air quality data are collected by AQDAS-II, all data are screened using a three level review process. Within 60 days from the end of the month, the air quality data will be submitted to the United States Environmental Protection Agency (U.S. EPA's) Aerometric Information Retrieval System (AIRS).

Toxics and Filter-based Sampling

Toxics and filter-based sampling media will be prepared and inspected by ARB laboratory personnel prior to being shipped to the field. All sampling media will be accompanied with a field sampling data sheet. This data sheet serves as a document to record sampling and chain-of-custody information for each sample collected at the site.

After sampling, the toxics and filter-based media will be returned to the ARB laboratory. Once the laboratory receives samples, the field information will be keyed into the Laboratory Information Management System (LIMS). LIMS serves as the tracking and storage system for all toxics and filter-based sampled data. The samples will be then sent to their respective laboratories for analysis. Once analysis is complete, toxics data will be entered into LIMS.

IX. Sampling Protocol

Criteria Pollutants:

Parameter	Analyzer	Sample Method	Frequency	Reporting Interval
Ozone	API 400	UV Photometry	Continuous	Hourly Average
Nitrogen Dioxide	TECO 42	Gas Phase Chemiluminescence	Continuous	Hourly Average
Carbon Monoxide	Dasibi 3008	Non-dispersive Infared Photometry	Continuous	Hourly Average
PM_{10}	Andersen Hi-Vol/SSI	Gravimetric Analysis	Continuous	Hourly Average
$PM_{2.5}$	Met-One BAM	Beta Attenuation	Continuous	Hourly Average

Meteorological Parameters:

Parameter	Analyzer	Sample Method	Frequency	Reporting Interval
Resultant Wind Speed	Met-One 010	Vector Summation	Continuous	Hourly Average
Resultant Wind Direction	Met-One 020	Vector Summation	Continuous	Hourly Average
Ambient Temperature	Met-One 060	Thermistor	Continuous	Hourly Average

Total Metal and Carbonyl Toxic Compounds:

Parameter	Sampler	Analysis Method	Frequency	Reporting Interval
Hexavalent Chromium	Xontech 920	IC UV-Visible	1 every 4 days	24-Hour Average
Total Metals*	Xontech 920	X-Ray Fluorenscence	1 every 4 days	24-Hour Average
Formaldehyde	Xontech 920	Silica-DNPH Cartridge w/ HPLC -UV	1 every 4 days	24-Hour Average
Acetaldehyde	Xontech 920	Silica-DNPH Cartridge w/ HPLC -UV	1 every 4 days	24-Hour Average
Methyl Ethyl Ketone	Xontech 920	Silica-DNPH Cartridge w/ HPLC -UV	1 every 4 days	24-Hour Average

*** See TABLE E for list of analyzed Toxic Compounds**

IX. Sampling Protocol (Continued)

Halogens, Aromatics, Butadiene and Oxygenate Toxic Compounds:

Parameter	Sampler	Analysis Method	Frequency	Reporting Interval
Benzene	Xontech 910	GC-PID	1 every 4 days	24-Hour Average
Toluene	Xontech 910	GC-PID	1 every 4 days	24-Hour Average
Ethyl-Benzene	Xontech 910	GC-PID	1 every 4 days	24-Hour Average
1,3-Xylene/1,4-Xylene	Xontech 910	GC-PID	1 every 4 days	24-Hour Average
Styrene	Xontech 910	GC-PID	1 every 4 days	24-Hour Average
1,2-Xylene	Xontech 910	GC-PID	1 every 4 days	24-Hour Average
1,4 Dichlorobenzene	Xontech 910	GC-PID	1 every 4 days	24-Hour Average
1,2 Dichlorobenzene	Xontech 910	GC-PID	1 every 4 days	24-Hour Average
1,3-Butadiene	Xontech 910	GC-PID	1 every 4 days	24-Hour Average
Dichloromethane (DCM)	Xontech 910	GC-ECD	1 every 4 days	24-Hour Average
Cloroform	Xontech 910	GC-ECD	1 every 4 days	24-Hour Average
Trichloroethane	Xontech 910	GC-ECD	1 every 4 days	24-Hour Average
Carbon Tetrachloride	Xontech 910	GC-ECD	1 every 4 days	24-Hour Average
Trichloroethylene (TCE)	Xontech 910	GC-ECD	1 every 4 days	24-Hour Average
Tetrachloroethyene (Perc)	Xontech 910	GC-ECD	1 every 4 days	24-Hour Average
MTBE	Xontech 910	GC-PID	1 every 4 days	24-Hour Average

PAH Toxic Compounds:

Parameter	Sampler	Analysis Method	Frequency	Reporting Interval
Benzo(b)Fluorantene	Andersen Hi-Vol/SSI	HPLC Scanning Fluorescence	1 every 4 days	24-Hour Average
Benzo(k)Fluorantene	Andersen Hi-Vol/SSI	HPLC Scanning Fluorescence	1 every 4 days	24-Hour Average
Benzo(A)Pyrene	Andersen Hi-Vol/SSI	HPLC Scanning Fluorescence	1 every 4 days	24-Hour Average
Dibenz(a,h)Anthracene	Andersen Hi-Vol/SSI	HPLC Scanning Fluorescence	1 every 4 days	24-Hour Average
Benzo(ghi)Perylene	Andersen Hi-Vol/SSI	HPLC Scanning Fluorescence	1 every 4 days	24-Hour Average
Indeno(1,2,3-cd)Pyrene	Andersen Hi-Vol/SSI	HPLC Scanning Fluorescence	1 every 4 days	24-Hour Average

X. Quality Assurance/Quality Control (QA/QC)

Monitoring and sampling will be conducted in accordance with Title 40, of the Code of Federal Regulations, Part 53 (40CFR53), Ambient Air Monitoring Reference and Equivalent Methods and Part 58 (40CFR58), Ambient Air Quality Surveillance. All field monitors and samplers will operate following the ARB's Quality Assurance Manual, Volume II. See attached tables for instrument specifications and standard operating procedure references.

XI. Deliverables

At the end of the study, all data collected will be compiled and a final report will be prepared. The final report will make comparisons between differences in TAC levels found at the Barrio Logan site and those measured at Chula Vista and El Cajon during the same time period. In addition, the report will make comparisons between Barrio Logan TAC data and historical state-wide averages. A summary of criteria pollutant concentrations measured during the study will also be reported.

TABLE E

List of Metals analyzed from Total Metal Filters

1. Aluminum
2. Silicon
3. Phosphorus
4. Sulfur
5. Chlorine
6. Potassium
7. Calcium
8. Titanium
9. Vanadium
10. Chromium
11. Manganese
12. Iron
13. Cobalt
14. Nickel
15. Copper
16. Zinc
17. Arsenic
18. Selenium
19. Bromine
20. Rubidium
21. Strontium
22. Yttrium
23. Zirconium
24. Molybdenum
25. Cadmium
26. Tin
27. Antimony
28. Barium
29. Mercury
30. Lead
31. Uranium